



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

X.

REVISION OF THE GENUS *CEANOTHUS*, AND DESCRIPTIONS OF NEW PLANTS,WITH A SYNOPSIS OF THE WESTERN SPECIES OF *SILENE*.

BY SERENO WATSON.

Read, March 9, 1875.

1. *Revision of the Genus CEANOTHUS.*

SOME of the species of this exclusively American genus are well marked and readily distinguished, but the larger number are defined with difficulty, and the value of the specific distinctions must still be considered in some cases as uncertain. It would be easy to increase the number of nominal species, as, on the other hand, with apparent reason, to considerably reduce them. But while endeavoring to give a nearly uniform value to the several characters, taking at the same time into consideration our imperfect knowledge of some of the forms, it has seemed best to retain as probably distinct some which seemingly run together, and at the same time to avoid as far as possible proposing new species. The following arrangement is as satisfactory as it could be made with present material and information.

§ 1. EUCEANOTHUS. Leaves all alternate, 3-nerved or pinnately veined, glandular-toothed or entire; fruit not crested.

* Leaves 3-nerved from the base.

† Erect shrubs, the branches not rigidly divaricate nor spiny; inflorescence thyrsoïd; leaves usually large, serrate except in (5).

a. Low (1-3 feet high); flowers white, or sometimes light blue in (5).

1. *C. AMERICANA*, Linn. More or less villous-pubescent; leaves thin, ovate or oblong-ovate, $1\frac{1}{2}$ - $2\frac{1}{2}$ inches long, on short petioles 2-6 lines long; peduncles elongated. — From the Atlantic to Winnipeg Valley, Iowa and Texas.

2. *C. OVATUS*, Bigel. Nearly glabrous or somewhat pubescent; leaves narrowly oval or elliptic-lanceolate, 1-2 inches long; peduncles usually short; otherwise like the last, into which it seems to pass.—Range the same.

3. *C. SANGUINEUS*, Pursh. (*C. Oreganus*, Nutt.) Becoming glabrous or nearly so; leaves thin, ovate, 1-4 inches long, on slender petioles 6-15 lines long; peduncles very short; older branches reddish.—From North-western Montana to Washington Territory. The specimens of Nuttall referred here in Torrey and Gray's Flora belong to the preceding species.

4. *C. VELUTINUS*, Dougl. Stout, usually glabrous; leaves coriaceous, broadly ovate or elliptical, $1\frac{1}{2}$ -3 inches long, resinous and shining above, sometimes velvety beneath, glandular-serrulate; petioles stout, 6 lines long; peduncles usually short.—Abundant in the mountains from Colorado to the Columbia and Northern California.

5. *C. INTEGERRIMUS*, Hook. & Arn. Glabrous or soon becoming so, rarely pubescent; branches terete, usually warty; leaves thin, bright green, ovate to ovate-oblong, 1-3 inches long, entire or very rarely slightly glandular-serrulate, on slender petioles 2-6 lines long; thyrses often large and open, terminating the slender branches, or axillary and rather shortly peduncled, mostly white-flowered.—Frequent in the mountains from Central California to the Columbia River. This will include *C. Californicus* and *Nevadensis* of Kellogg.

Var.? *PARVIFLORUS*. Of very slender habit, wholly glabrous; leaves much smaller, about half an inch long, short-petioled; flowers light blue, in rather short simple racemes.—In the Sierra Nevada from the Yosemite Valley northward. Possibly distinct, but intermediate forms occur. It is 51 Bridges, 1628 Brewer, 3880 and 4870 Bolander, 68 and 68*a* Torrey, and was also collected by Bigelow and by Dr. Gray.

b. Tall shrubs or small trees, 6-15 feet high; flowers bright blue; leaves oblong to oblong-ovate, rather thick.

6. *C. THYRSIFLORUS*, Esch. Subglabrous; branches strongly angled; leaves usually smooth and shining above, caescent beneath, glandular-serrulate, 1- $1\frac{1}{2}$ inches long; flowers in dense subcompound racemes, terminating the usually elongated and somewhat leafy peduncles.—In the Coast Range, California, from Monterey to Humboldt County, and popularly known as the "California Lilac."

Var.? *MACROTHYRSUS*, Torrey in Bot. Wilkes' Explor. Exped. 263. This is described as having terete branches; leaves 1- $2\frac{1}{2}$ inches long,

grayish tomentose underneath and somewhat silky-villous on the prominent veins, entire, on petioles 3–5 lines long; flowers in elongated, interrupted, somewhat leafy panicles. It was found on the banks of the Umpqua, Oregon, and is probably distinct.

7. *C. AZUREUS*, Desf. Pubescent; leaves densely rusty-tomentose beneath, smoothish above, 1–2½ inches long; thyse more open. — Mountains of Mexico from Tepic to Guatemala.

+ + Low, the branches not rigidly divaricate nor spiny; flowers in short simple racemes or pedunculate clusters; leaves small.

a. Eastern species; flowers white.

8. *C. MICROPHYLLUS*, Michx. Erect, nearly glabrous; branches numerous, slender, leafy, yellowish; leaves thick, very small, 1–2 lines long, fascicled, oblong-elliptic to obovate, entire or sparingly toothed, on very short petioles; flowers in small terminal clusters. — Pine forests of Georgia and Florida.

9. *C. SERPYLLIFOLIUS*, Nutt. Decumbent, glabrate; branches slender, brownish; leaves less rigid and not fascicled, 3–6 lines long, oblong, serrulate, somewhat hairy beneath; flowers in small clusters on slender axillary peduncles. — Southern Georgia.

b. Western species; flowers blue.

10. *C. DENTATUS*, Nutt. Erect, hirsutely pubescent, rarely nearly glabrous; leaves ¼–1 inch long, usually small and fascicled, obovate to oblong-elliptic or lanceolate, acute at both ends or obtuse at the apex, glandular-serrate, the margin becoming strongly undulate or revolute; flowers in small roundish clusters, on naked terminal peduncles about an inch long; fruit resinously coated and somewhat triangular, the valves being obscurely costate. — On dry hills in the Coast Range, from Monterey to Mendocino; Douglas, Bigelow, and Brewer (n. 643, 984, and 2374). The larger-leaved form (2392 Bolander) is *C. Lobbianus*, Hook., and will also be the *C. diversifolius* of Kellogg, if any opinion can be formed from his description. The smaller leaves are apparently feather-veined, and often more or less resinous.

11. *C. DECUMBENS*. Slender, trailing, hirsutely pubescent with spreading hairs; leaves rather thin, flat, ½–1½ inches long, elliptic-oblong, somewhat cuceate at base, obtuse or acutish, glandular-serrate, the greenish glands usually stipitate; flowers in short dense shortly pedunculate racemes, about ½ inch long or less. — Frequent in the mountains of Central California, from the Mariposa Grove northward; collected by Fremont (n. 357), Bigelow (*S. sorediatus* of Whipple's

Report), Stillman, Brewer (n. 1624), Bolander (n. 6331), and Torrey (n. 69).

+ + + Erect shrubs, the branches usually rigid, divaricate, or spinose; flowers in simple racemes or clusters; leaves rather small.

a. Rarely or never spinose; leaves glandularly serrulate; flowers mostly blue, racemose.

12. *C. HIRSUTUS*, Nutt. (*C. oliganthus*, Nutt.) Silky-pubescent with soft subappressed or spreading hairs, or sometimes hirsute, the branches rather rigid and said to be sometimes spinose; leaves ovate to oblong-ovate, usually subcordate or rounded at base and acute at apex, $\frac{1}{2}$ – $1\frac{1}{2}$ inches long, not smooth above; flowers blue, in simple axillary and terminal racemes 1–3 inches long, or rarely thyrsoïd; fruit unknown. — Dry hills about Santa Barbara and in the Santa Susanna mountains; Nuttall, Wallace, Brewer (n. 214, 289, 297, 298).

Var.? *GLABER*. (*C. sorediatus*, var. *glaber*, Watson in King's Rep. 5. 51.) Glabrous throughout or nearly so; leaves sometimes entire; flowers white. — East Humboldt Mountains, Nevada; Watson (n. 212).

13. *C. SOREDIATUS*, Hook. Nearly glabrous, the inflorescence pubescent; leaves smooth above, more or less tomentose beneath or rarely nearly glabrous, silky on the veins, oblong-ovate, $\frac{1}{2}$ – $1\frac{1}{2}$ inches long, subcordate or rounded or often acutish at base, acute or obtuse at the apex; flowers blue, in shortly peduncled simple racemes, $\frac{1}{2}$ –2 inches long; fruit unknown. — From San Diego to the Sacramento; Douglas, Bigelow (*S. incanus* of Whipple's Report), Bridges (n. 52), Brewer (n. 286, 1105), and Bolander (n. 4558), — the latter a form with small leaves densely white-tomentose beneath.

b. Branches mostly spinose, grayish; leaves subcoriaceous, usually entire; flowers mostly white, racemose.

14. *C. DIVARICATUS*, Nutt. Nearly glabrous; leaves oblong-ovate to ovate, $\frac{1}{3}$ – $1\frac{1}{4}$ inches long, rounded at base, acute or obtuse above, not tomentose beneath; flowers light blue or white, in subsimple often elongated racemes 1–4 inches long. — California, from San Diego northward; Douglas, Nuttall, Coulter (n. 122), Wallace, Bigelow (var. *eglandulosus* and *C. integerrimus* in part, of Whipple's Report), Parry, Cleveland. Also from the "Snake Country," collected by Tolmie.

15. *C. INCANUS*, Hook. Leaves hoary beneath with a very minute tomentum, broadly ovate to elliptic, $\frac{3}{4}$ –2 inches long, cuneate to cordate at base, acutish or obtuse at apex; flowers in short racemes; fruit over

2 lines in diameter, resinously warty. — Santa Cruz to Lake County, California; “a large straggling shrub on the banks of creeks.” Collected by Douglas, Brewer (n. 2663), Bolander (*m.*), Kellogg & Harford (n. 126), and Dr. Gray.

16. *C. CORDULATUS*, Kellogg, Proc. Calif. Acad. 2. 124, f. 39. Hirsutely pubescent with short erect or spreading hairs; leaves oval-elliptic, $\frac{1}{2}$ – $1\frac{1}{4}$ inches long, cuneate to subcordate at base, usually rounded and sometimes serrate at the apex, the serratures scarcely glandular; flowers in short simple racemes, an inch long or less; fruit smaller, not resinously dotted. — In the Sierra Nevada, from the Yosemite Valley northward; “low, flat-topped and much spreading, known as ‘snow-bush.’” Collected by Brewer (n. 1630, 1926), Bolander (n. 4892), Bridges (n. 46), Gray and Lemmon.

17. *C. FENDLERI*, Gray. Silky pubescent; leaves narrowly oblong to elliptic, 4–12 lines long, usually small, somewhat narrowed and cuneate at base, obtuse or acute above; flowers in short terminal racemes. — In the Rocky Mountains from Colorado to New Mexico.

c. Spinose; leaves serrate; flowers in small sessile clusters. Mexican.

18. *C. BUXIFOLIUS*, Willd. Nearly glabrous, branches slender; leaves rather thin, elliptic, $\frac{1}{2}$ inch long or less, hairy on the veins beneath, sharply serrate; flowers in axillary clusters, the color uncertain. — Mountains of Central and North-western Mexico.

19. *C. DEPRESSUS*, Benth. Stout and very rigid, tomentose; leaves thick, densely tomentose beneath, elliptical, $\frac{1}{2}$ – $\frac{3}{4}$ inch long, mostly rounded at each end, glandular-serrulate; flowers in mostly terminal clusters, color uncertain. — Central Mexico.

* * Leaves pinnately veined. (Forms of *C. dentatus* might be referred to this group.)

20. *C. SPINOSUS*, Nutt. Becoming a small tree, 20–30 feet high, branchlets rigid and somewhat spiny, glabrous or nearly so; leaves subcoriaceous, entire, oblong, 9–15 lines long, obtuse or retuse, subcuneate at base, on slender petioles 2–4 lines long; flowers deep blue, in a thyrse or in simple racemes, very fragrant; fruit $2\frac{1}{2}$ –3 lines in diameter, resinously coated. — From Santa Barbara to Los Angeles, commonly known as “Redwood;” Nuttall, Parry, Brewer (n. 56, 74, 255, 287).

21. *C. PAPILLOSUS*, Torr. & Gray. More or less subhispidly villous or tomentose, 4–6 feet high; leaves glandularly serrulate, the upper surface glandular-papillose, narrowly oblong, obtuse at each end, 1–2

inches long, on slender petioles; flowers blue, in close clusters or short racemes terminating slender naked peduncles; fruit $1\frac{1}{2}$ lines broad, not resinous. — Coast Range, from Monterey to San Francisco; Douglas, Bolander (*n.*), Dr. Gray.

22. *C. FLORIBUNDUS*, Hook. Bot. Mag. t. 4806. Pilose-scabrous; leaves small, 3–4 lines long, oblong, acute, glandularly denticulate and undulate, shortly petioled; flowers blue, in dense globose clusters sessile at the ends of the short branchlets. — Known only from the figure and description in the Botanical Magazine; raised from Californian seeds, and closely related to *C. dentatus*.

23. *C. VEATCHIANUS*, Hook. Bot. Mag. t. 5127. Glabrous nearly throughout; leaves thick, obovate-cuneate, rounded at the apex; glandular-serrate, smooth and shining above, minutely tomentose beneath between the veinlets, 6–9 lines long, on short stout petioles; flowers bright blue, in dense crowded clusters at the ends of the leafy branches. — Likewise known only from figures and descriptions of specimens cultivated in foreign gardens.

§ 2. *CERASTES*. Leaves mostly opposite, 1-ribbed, with numerous straight parallel veins, very thick and coriaceous, spinosely toothed or entire; flowers in sessile or shortly pedunculate axillary clusters; fruit larger, with three hornlike or warty prominences below the summit. Rigidly branched or rarely spiny shrubs, with small leaves; stipules mostly swollen and warty.

24. *C. CRASSIFOLIUS*, Torr. Erect, 4–12 feet high, the young branchlets white with a villous tomentum; leaves ovate-oblong, $\frac{1}{2}$ –1 inch long, obtuse or retuse, more or less tomentose beneath, rarely entire and revolutely margined, the petioles very thick; flowers light blue or white, in dense very shortly peduncled clusters. — In the Coast Range from Mendocino County to San Diego; Bigelow, Parry, Wallace, Brewer (*n.* 295), Bolander (*n.* 4713), and Kellogg.

25. *C. CUNEATUS*, Nutt. Erect, 3–12 feet high, less tomentose or nearly smooth; leaves cuneate-obovate or -oblong, rounded or retuse above, on rather slender petioles, entire or very rarely few-toothed; flowers white or occasionally light blue, in rather loose clusters. — From the Columbia River to Santa Barbara, by numerous collectors.

26. *C. GREGGII*, Gray. Closely resembling the last, but more tomentose, and the leaves not cuneate at base; 5 feet high. — From Northern Arizona to New Mexico and Northern Mexico; Gregg, Wright, Bigelow (*C. cuneatus* of Ives's Report), and Bishop.

27. *C. RIGIDUS*, Nutt. Erect, 5 feet high, the branchlets tomentose; leaves 2-5 lines long, cuneate-oblong or usually very broadly obovate, often emarginate, few-toothed above, very shortly petioled; flowers bright blue, in sessile clusters. — About Monterey and Oakland (?), California; Nuttall, Douglas, Coulter (n. 125), and Hartweg (n. 1680).

28. *C. PROSTRATUS*, Benth. Prostrate, nearly glabrous; leaves 3-12 lines long, obovate or usually oblong-cuneate, spinose usually only at the apex, on short slender petioles; flowers bright blue, the clusters on stout peduncles. — Frequent in the mountains from Humboldt County and the Upper Sacramento to Mariposa County; found on both slopes of the Sierra Nevada.

2. *Descriptions of New Plants of Various Orders, from the Pacific States and Western Territories, with a Synopsis of the Western Species of SILENE.*

CLEMATIS FREMONTII. Stems stout, erect, clustered, 6-12 inches high, leafy and usually branched, more or less villous-tomentose, especially at the nodes; leaves simple, 3-4 pairs, coriaceous and with the veinlets conspicuously reticulated, sparingly villous, sessile, broadly ovate, entire or few-toothed, acutish, 2-4 inches long; flowers terminal, nodding, the thick purple sepals an inch long, narrowly lanceolate, tomentose upon the margin, recurved at the tip, the peduncles becoming erect in fruit; akenes silky, 3-4 lines long, the tails less than an inch long, naked above, silky at base. — This well-marked species, the western representative of *C. ochroleuca*, was first collected by Fremont (n. 194) on his second expedition, but without note of the locality. It was rediscovered during the past season by Louis Watson, M.D., in the neighborhood of Ellis, Kansas.

CARDAMINE BREWERI. Perennial, glabrous or slightly pubescent at base; stems weak and ascending, usually simple, a foot high; leaves with 1-2 pairs of rounded or oblong leaflets, the terminal one much larger, $\frac{1}{2}$ -1 inch or more in diameter, entire or coarsely sinuate-toothed or lobed, obtuse, often somewhat cordate at base, the radical leaves mostly simple and cordate-reniform; petals 2 lines long, white; pods 8-15 lines long, ascending on pedicels 3-4 lines long, obtuse or scarcely beaked with a short style. — This species is allied to the Californian *C. paucisecta*, which has larger flowers and acutely beaked pods on elongated pedicels. *C. hirsuta* and *oligosperma* have more

numerous leaflets, smaller flowers, and more slender acute pods. *C. angulata* from Oregon is well characterized by its 3-foliate leaves with nearly equal and similar leaflets, its short pods on slender pedicels, and by its slender loose-flowered habit.

Found in the mountains from the northern Sierra Nevada (1890 Brewer, near Sonora Pass at 8–10,000 feet altitude; 235 Anderson, near Carson City, = *C. paucisecta*, var. *angulata* of Anderson's Catalogue of Nevada plants) to Oregon (31 Hall = *C. oligosperma*, Gray in Proc. Am. Acad. 8.376) and eastward to Wyoming (Hayden, east slope of the Teton Range, Idaho, and on Henry's Fork of the Green River, = *C. paucisecta* of Hayden's Reports for 1870 and 1872).

SILENE MONANTHA. Glabrous; stems very weak, elongated, ascending, branched; leaves narrowly oblanceolate, $1\frac{1}{2}$ –3 inches long, acuminate, shortly ciliate at base; flowers terminal on elongated peduncles, not reflexed; calyx inflated, thin and submembranous, 6 lines long, slightly puberulent, the triangular acutish teeth only net-veined, the scarious edge subciliate; petals 9 lines long, apparently pinkish or white, the naked claw very narrowly auricled, limb bifid with broad rounded lobes, coronal appendages lanceolate, entire, half as long as the limb; filaments naked; styles short; ovary oblong, rather long-stipitate. — Collected by Kellogg & Harford (n. 78), growing on the debris at base of Castle Rock, Cascades, Washington Territory. This and the two next following species are the only known western *Silenes* of the group with inflated calyces.*

* Our western species of *Silene* may be arranged and partially differentiated as follows:—

§ *Annuals.*

1. *S. ANTIRRHINA*, Linn. Erect, glabrous; flowers small, in an open naked dichotomous panicle. — Throughout the United States.

§§ *Perennials.*

* Dwarf, matted; flowers terminal and solitary.

2. *S. ACAULIS*, Linn. Alpine and arctic.

* * Calyx campanulate, inflated.

3. *S. MONANTHA*. Stems weak, elongated; flowers terminal and solitary, long-pedunculate; limb bifid. — Washington Territory. See above.

4. *S. CAMPANULATA*. Stems erect, dichotomous at the summit; flowers few, pendent; claws and filaments pubescent; limb 4-parted with bifid segments. — North-western California. See p. 341.

5. *S. LYALLII*. Stems erect, slender; flowers more numerous, in a loose panicle, erect; limb bifid, brownish purple. — Washington Territory. See p. 342.

SILENE CAMPANULATA. Glandular-puberulent; stems clustered, from a thick rootstock, erect, 6–10 inches high, simple or dichotomously

* * * Calyx oblong-cylindric or clavate, expanded by the enlarging capsule.

a. Low and spreading or decumbent; inflorescence leafy; flowers white.

6. *S. MENZIESII*, Hook. Flowers very small, petals bifid, without corona. — Rocky Mountains to the Pacific.

7. *S. WRIGHTII*, Gray. Flowers large, subsolitary; petals 4-cleft. — New Mexico.

8. *S. HOOKERI*, Nutt. (*S. Bolanderi*, Gray.) Flowers very large; petals 4-parted. — California.

b. Erect; panicle naked, usually spreading; petals 4-parted or -cleft.

9. *S. LACINIATA*, Cav. Flowers very large, bright scarlet; petals deeply 4-cleft, the lateral lobes spreading and shorter; leaves narrowly lanceolate. — Southern California and Mexico.

Var. *GREGGII*. (*S. Greggii*, Gray.) Leaves oblong-lanceolate to ovate. — New Mexico.

Var. *CALIFORNICA*, Gray. (*S. Californica*, Dur.) Stem lax, often low and leafy throughout; leaves oblong-lanceolate to ovate; lobes of the petals sometimes cleft. — California.

10. *S. LEMMONI*. Slender, subglabrous; calyx short, with acute teeth; petals equally 4-parted; capsule nearly sessile. — Northern Sierras. See p. 342.

11. *S. OCCIDENTALIS*. Stout and tall, glandular; calyx long, with obtuse teeth; petals deeply 4-cleft, the villous claw not auricled; capsule long-stipitate. — Northern Sierras. See p. 343.

12. *S. OREGANA*. Glandular; petals 2-parted, with filiform bifid lobes; claw very narrow, the auricles produced upwards; capsule long-stipitate. — Oregon. See p. 343.

13. *S. MONTANA*. Slender, puberulent, the panicle narrower; petals equally 4-cleft, the corona and auricles lacerate; capsule long-stipitate. — Northern Sierras. See p. 343.

14. *S. THURBERI*. Tall, erect, glandular-pubescent; inflorescence elongated; flowers small; petals narrow, inconspicuous, the short limb cleft to the middle, with smaller lateral lobes, the auricles produced upwards. — New Mexico. See p. 343.

c. Inflorescence similar; petals bifid.

15. *S. PECTINATA*. Stout and tall, glandular; calyx-teeth long and lanceolate; claw narrow and not auricled. — Northern Sierras. See p. 344.

16. *S. INCOMPTA*, Gray. Tall, lax, puberulent; leaves broadly lanceolate; calyx-teeth oblong, acute; lobes of the petals often toothed. — Yosemite Valley.

17. *S. VERECUNDA*. Low, erect, glandular above; leaves narrow; calyx-teeth ovate; claw broad. — Near San Francisco. See p. 344.

d. Flowers usually few, in a naked narrow subracemose panicle; petals bifid, with entire lobes; leaves linear-lanceolate.

18. *S. DOUGLASSII*, Hook. Petals pink, with auricled claws and broad obtuse lobes. — From the Wahsatch to the Sierra Nevada and northward.

branched at the summit; leaves lanceolate, 1-1½ inches long, acute or acuminate; flowers solitary or few, on short deflexed pedicels; calyx campanulate, 5-6 lines long, the teeth broad, obtuse or acutish, and finely net-veined; petals pale flesh-color, 9 lines long, with pubescent scarcely auriculate claws, the limb 4-parted nearly to the base, the lobes bifid to the middle, or the lateral ones entire or notched; appendages oblong, fleshy, entire; filaments pubescent, exserted; ovary suborbicular, shortly stipitate. — Collected on Red Mountain, Mendocino County, California, by Bolander (n. 6517) and Kellogg.

SILENE LYALLII. Glabrous excepting the inflorescence, which is subglandular-puberulent; stems slender, ascending; leaves linear-oblancoate, 1-2 inches long, the lower attenuate to a slender petiole; flowers in dichotomous few-flowered cymes, the slender pedicels 3-4 lines long, not deflexed; calyx 4 lines long, campanulate, net-veined above, the teeth obtuse, broadly triangular; petals 7 lines long, brownish purple, with an oblong shortly bifid limb, oblong entire appendages, and naked scarcely auricled claw; anthers purple, included; styles very short; ovary small, narrowly oblong. — Collected by Lyall in the Cascade Mts. in 1859, and by Lemmon (n. 16) in Sierra County, California.

SILENE LEMMONI. Glabrous or puberulent, the inflorescence glandular-puberulent; stems erect from a decumbent perennial base, slender, 8-12 inches high, branched; leaves mostly on young shoots, spatulate to oblong-lanceolate, an inch long, acute; flowers in an open dichotomous panicle, erect or at length deflexed, on slender pedicels 4-9 lines long; calyx ovate-cylindric, 4 lines long, net-veined along the main nerves, the teeth acutely triangular; petals rose-color, 6-8 lines long, the broad limb 4-parted nearly to the base, with linear entire or notched lobes, the lanceolate appendages entire, and the villous claw narrowly auricled; ovary oblong, shortly stipitate. —

19. **S. BRIDGESII**, Rohrb. Petals white, very narrow, the claw scarcely auricled, and lobes narrowly linear; styles very long exserted. — Yosemite Valley.

e. Inflorescence similar, but flowers more numerous and usually somewhat crowded; stout, erect, and glandular.

20. **S. SCOULERI**, Hook. Glandular above; leaves narrow; calyx teeth net-veined; petals conspicuous, the broad bifid limb with notched lobes and appendages; capsule long-stipitate. — Colorado to Oregon.

21. **S. SPALDINGII.** Viscidly pubescent; leaves numerous, lanceolate; calyx wholly net-veined; petals with a broad claw, a short obtuse notched limb, and 4 short distinct appendages; capsule short-stipitate. — Central Idaho. See p. 344.

Collected by Mr. J. G. Lemmon (n. 17, 18) in Sierra County, California.

SILENE OCCIDENTALIS. Glandular-puberulent, or somewhat tomentose below; stems stout, erect from a vertical rootstock, 2 feet high, branching; leaves oblanceolate, 2-4 inches long, acute, the lower ciliate at base; flowers in an open dichotomous panicle, erect or sometimes nodding, on pedicels 6-15 lines long; calyx cylindrical, 6-8 lines long, net-veined along the main nerves, the teeth ovate, obtuse; petals 9-12 lines long, apparently deep purple, deeply 4-cleft with nearly equal lobes or the lateral smaller, appendages lanceolate and entire, the claw naked and without auricles; filaments slightly exerted; ovary oblong, equalling the stipe. — Collected by Lemmon in Sierra County, California.

SILENE OREGANA. Viscidly pubescent; stems ascending, simple, a foot high or more; leaves oblanceolate, acute, 1-2 inches long; flowers in an open dichotomous panicle, somewhat nodding upon slender pedicels 3-6 lines long; calyx oblong-cylindrical, 6 lines long, somewhat membranous, with oblong acutish teeth; petals white, 10 lines long, the narrow limb parted to the base and the lobes deeply bifid with filiform segments, the linear appendages entire, and the very narrow naked claw with the auricles produced upward into lanceolate teeth; filaments and styles somewhat exerted; ovary oblong, long-stipitate. — Collected in the Blue Mountains, Oregon, by Rev. R. D. Nevius, 1873.

SILENE MONTANA. Puberulent; stems erect from a decumbent perennial base, mostly simple, a foot high; leaves narrowly oblanceolate, $1\frac{1}{2}$ -2 inches long, acuminate; flowers in a narrow subdichotomous panicle, erect upon usually short pedicels; calyx cylindrical, 7-9 lines long, the oblong teeth acutish; petals 7-10 lines long, apparently rose-color, the broad limb deeply 4-cleft with equal entire linear segments, claws naked, the auricles and broad ovate appendages somewhat lacerate; filaments scarcely exerted; ovary oblong, the stipe becoming 2 lines long. — Near Carson City, Anderson (n. 107), and also collected by Lemmon at the Big Meadows, Sierra County, California.

A similar but probably distinct form has been collected by Rev. R. D. Nevius in the Blue Mountains, Oregon, having the short quadrate limb barely notched, the coronal appendages and the auricles entire or nearly so, and the carpophore much shorter.

SILENE THURBERI. Glandular-tomentose; stems tall, erect; leaves lanceolate, acuminate; flowers small, in a narrow elongated panicle, erect on rather slender pedicels; calyx cylindrical, 6 lines long, with

narrow acute teeth, strongly 10-nerved, net-veined above; petals white, scarcely exserted, the limb bifid with a shorter lobe on each side, the narrow naked claw having the auricles produced upwards as far as the short oblong appendages and somewhat hooded; filaments exserted; styles included; ovary narrowly oblong, shortly stipitate. — Collected only by Dr. Thurber (n. 726) in August, 1852, in arroyos near Janos, near the boundary line of South-western New Mexico.

SILENE PECTINATA. Viscidly pubescent; stems erect, stout, $1\frac{1}{2}$ feet high, simple or branched; leaves lanceolate, acuminate, $1\frac{1}{2}$ – $2\frac{1}{2}$ inches long, the radical attenuate to a long slender petiole equalling the blade; flowers in a narrow strict or dichotomously branched panicle, erect on pedicels $\frac{1}{2}$ –1 inch long; calyx oblong, 6–9 lines long, cleft nearly to the middle, the teeth narrow, acute; petals dark rose or purple, nearly an inch long, the naked claw narrow and without auricles, the broadly oblong limb deeply bifid with obtuse segments, the lanceolate appendages entire; ovary oblong, the capsule nearly sessile. — Collected near Carson City by Dr. Anderson (n. 18); in Walker's Meadows by Brewer (n. 1857); and in Plumas County, California, by Mrs. M. P. Ames, and also by Lemmon.

SILENE VERECUNDA. Glandular-pubescent; stems low, clustered, erect, 8–10 inches high, simple; leaves oblanceolate, acute, $1\frac{1}{2}$ –2 inches long; flowers few, in a loose panicle, erect upon mostly elongated pedicels $\frac{1}{2}$ –1 inch long; calyx oblong-cylindric, 6 lines long, with acutish triangular teeth, net-veined above; petals 9 lines long, rose-colored, the oblong limb cleft to the middle with linear entire lobes, the appendages notched at the apex, and the naked claw narrowly auricled; filaments included; ovary oblong, shortly stipitate. — Near *S. incompta*. Collected only by Bolander (n. 352), on rocky hills near Mission Dolores.

SILENE SPALDINGII. Viscidly tomentose; stems erect, stout, a foot high or more, simple or branched, very leafy; leaves lanceolate to oblong-lanceolate $1\frac{1}{2}$ –2 inches long, acutish; flowers in a short strict racemose panicle, nodding or erect; calyx oblong-cylindric, 7–8 lines long, with large triangular-ovate acutish teeth, net-veined to the base; petals scarcely exserted, the broad auricled claw naked, the limb very short and triangular, notched at the apex, and with four small lanceolate appendages at base; filaments and styles included; ovary oblong, shortly stipitate. — Collected only by Spalding on the Clear Water in Central Idaho.

SAGINA OCCIDENTALIS. Annual, glabrous, very slender and deli-

cate, 2-4 inches high, spreading or decumbent at base; leaves not fascicled, pungent; flowers on elongated pedicels, truncate at base, pentamerous; petals nearly equalling the sepals; stamens 10. — This is the western equivalent of *S. decumbens* of the Eastern States (*S. subulata* of authors, but apparently not of Wimmer), found in the valleys and borders of salt marshes from Oregon to San Francisco. It has been collected by Bolander (n. 3891), Brewer (n. 2522), and by Bigelow and Greene in California; it is in Hall's Oregon collection (n. 58) as *S. Linnæi*, and was also found by Lyall. It differs especially from *decumbens* in its laxer and slenderer habit, more elongated pedicels, and in the somewhat less conical base of the calyx.

CLAYTONIA TRIPHYLLA. Root tuberous, small; stem slender, 2-3 inches high, bearing a whorl of three or rarely but a pair of narrowly linear leaves, 1-2 inches long; flowers small, in a sessile or pedunculate spreading panicle; bracts minute; petals oblong, 2 lines long, a half longer than the rounded sepals. — First collected by myself in July, 1867, above Cisco, California, and since by Dr. Kellogg in the same locality, as well as by Dr. Asa Gray in Yosemite Valley, and by J. G. Lemmon in Sierra County. Probably not rare in the high Sierra Nevada.

LUPINUS (PLATYCARPOS) SILERI. Erect and slender, branching above, loosely and softly villous, 4-8 inches high; leaflets 5, oblan- ceolate, acutish, smooth above, 5-12 lines long, shorter than the petioles; racemes short and dense, long-peduncled, the pedicels very short, not verticillate; bractlets linear; calyx-lobes herbaceous, 3 lines long, toothed, the upper slightly shorter; petals light purple, narrow, equal, little exceeding the calyx. — Southern Utah and on the Rio Grande in Southern Colorado; A. L. Siler, Wolf (n. 195) and Parry (n. 43). Readily distinguished from *L. pusillus* by its slender habit, softer pubescence, and capitate long-peduncled racemes.

ASTRAGALUS THOMPSONÆ. Allied to *A. malacus*; shortly caulescent, densely villous-tomentose throughout; leaves elongated, with ten to fifteen pairs of leaflets, which are oblong to obovate, obtuse or emarginate, 2-4 lines long; racemes long-peduncled, about equalling the leaves, rather densely flowered; calyx cylindrical, with short triangular and acuminate teeth; flowers purple, 6 lines long, the keel equalling the banner, obtuse and scarcely beaked; pod densely silky, coriaceous, 2-celled, ovate, arcuate, acuminate, 6-8 lines long, somewhat sulcate on both sides. — With much of the habit of members of the *Eriocarpus* section, but distinguished by the 2-celled legume.

Collected in Southern Utah on Col. Powell's expedition by Mrs. E. P. Thompson and Capt. F. M. Bishop.

ASTRAGALUS (HOMALOB) SESQUIFLORUS. Near *A. pauciflorus* of Oregon and British America, but differing in the 1-2-flowered raceme equalling the leaves, the keel terminating in a long straight beak, and in the gibbous slightly compressed pod. Cæspitose; pubescence appressed silky-canescenscent; stems very slender, 2-4 inches long; leaflets 2-5 pairs, linear-lanceolate and acute at each end, 3-4 lines long; calyx campanulate, with linear-setaceous teeth longer than the tube; flowers purple, 3-4 lines long, a little exceeding the calyx; pod membranous, 4 lines long, attenuate to the base. — Southern Utah, collected by Capt. F. M. Bishop, 1873.

ASTRAGALUS (HOMALOB) EPISCOPUS. Somewhat canescenscent with short appressed hairs, glabrous below; stems slender, erect or ascending, 1½-2 feet long, branched; leaflets distant on the slender rachis, 1-3 pairs or sometimes none, narrowly linear, acute, 4 lines long; flowers scattered in a short raceme, purple or yellowish; calyx short, cylindric, 2 lines long, with acute triangular teeth; banner 6 lines long, exceeding the wings and the straight scarcely beaked keel; pod narrowly oblanceolate, compressed, 1¼ inches long, 2½ lines broad, acute at each end, very shortly stipitate, reflexed. — Resembling *A. junceus* from which it is separated by its larger straighter flowers, longer calyx with more acute teeth, and by its much broader pod. Southern Utah; Capt. F. M. Bishop.

CERCOCARPUS INTRICATUS. (*C. breviflorus*, Watson in King's Rep. 5. 83, not of Gray.) Distinguished from *C. ledifolius*, to which it is perhaps most nearly allied, by its low shrubby rigid and intricately branched growth, by its short closely revolute leaves, and by its much smaller flowers and fruit. The little known *C. breviflorus* of New Mexico, with a somewhat similar habit, has still smaller flowers, and the cuneate oblong leaves less coriaceous, strongly nerved, and more or less silky puberulent; its fruit is unknown. The present species was frequent on rocky mountain sides near the mouth of American Fork Cañon in the Wahsatch (314 Watson), and has been recently collected by Parry (n. 59) near Saint George in Southern Utah.

ASARUM HARTWEGI. (*A. Hookeri*, var. *majus*, Duchartre in DC. Prodr. vol. 15, part 1, p. 424.) A stouter species than *A. caudatum*, Lindl., (*A. Hookeri*, Fielding), growing in thick tufts with shorter rootstocks and peduncles, and usually more pubescent especially at the base and upon the calyx; leaves mottled; flowers half an inch broad, the calyx-lobes leathery, ovate and attenuate to a filiform apex, 1-1½

inches long; filaments rather stout, scarcely attached to the base of the style, the anthers nearly a line long, and the setaceous appendage of the connective 1-2 lines long; styles short, nearly distinct, scarcely equalling the anthers; ovary inferior; seeds ovate, smooth, 2 lines long. — In the mountains of middle California, at an altitude of 4-7,000 feet. *A. caudatum*, which ranges much farther northward, is not tufted and has smaller flowers upon slender pedicels, the calyxlobes narrower and more attenuate, filaments slender, anthers shorter but much exceeding the acute apex of the connective, the styles united and equalling the stamens, and the seeds somewhat smaller.

AMARANTUS LEUCOCARPUS. Stout, 4-5 feet high, glabrous, green, with spreading branches; leaves large, ovate-oblong, subacuminate, 3-6 inches long, cuneate at base and decurrent upon the petiole, which is as long or longer; flowers in thick compact nodding spikes, 2-6 inches long, the lateral spikes divaricate; seed large, over $\frac{1}{2}$ line broad, smooth, dull white or light brown, the central albumen prominent. — Cultivated from seeds obtained by Col. Powell in Arizona, and well marked by its dense nodding spikes, its large leaves and by the characters of its seeds, which are collected by the Indians for food.

AMARANTUS POWELLII. Slender, 4-5 feet high, glabrous, the stem becoming bright red, branches erect; leaves small, oblong-lanceolate, 2 inches long, cuneate at base, the slender petiole shorter; flowers in close narrow compound spikes, the lateral ones erect; seed nearly black, shining, less than half a line broad, lenticular, very minutely and slightly tuberculate. — Likewise cultivated from seeds brought from Arizona by Col. Powell, and apparently a very distinct species. *A. albus* and *retroflexus* were also raised from the same collection of Arizona seeds, used as food by the Indians. The only other species known from our western territory and apparently indigenous are *A. chlorostachys* and *Blitum*.

ERIOGONUM (ALATA) TRISTE. Sparingly villous or glabrate; scape tall and erect, the inflorescence an elongated alternately branched panicle, with the branches dichotomous; bracts small, herbaceous, linear; involucre glabrous, acutely 5-toothed, on rather slender smooth peduncles; flowers a line long, glabrous, brownish red, the lobes oblong, obtuse; achenium narrow, 2 lines long or more, membranously winged its whole length. — Kane County, Southern Utah, collected by Mr. A. L. Siler. Radical leaves probably narrowly oblanceolate as in the other species of the group. With the habit of *E. alatum*, but nearly glabrous above and the flowers dark red.

ERIOGONUM (UMBELLATA) URSINUM. Densely tomentose, the

peduncles and inflorescence subvillous; leaves ovate, 4–6 lines broad, acute, cordate to cuneate at base, upon a rather short petiole; peduncles stout, naked, 8 inches high, from a diffusely branched woody base, bearing a compound umbel of about 6 rays; bracts large and foliaceous; involucre large and turbinate, with erect acute teeth; flowers pale yellow, glabrous, $1\frac{1}{2}$ lines long, the filaments very villous. — Distinguished from the rare form of *E. umbellatum* with a compound umbel by the short erect teeth of the involucre and by the villous pubescence. Collected in Plumas County, California, by Mrs. M. E. P. Ames and J. G. Lemmon, in Long and Bear Valleys, apparently abundant.

ERIOGONUM (VIRGATA) BAILEYI. Annual, slender, diffusely much branched, a foot high, glaucous and wholly glabrous excepting the whorl of leaves at the base, which are densely white-tomentose on both sides, orbicular to broadly ovate, 3–6 lines in diameter; bracts small; involucre narrow, a line long or usually less, open at the throat, with obtuse teeth; flowers pinkish white, $\frac{1}{2}$ – $\frac{3}{4}$ of a line long. — Referred to *E. gracile*, var. *effusum*, by Dr. Gray in the Revision of the genus, but more nearly allied to *E. vimineum*, which however is more tomentose above the base, the involucre longer and contracted at the mouth, and the flowers somewhat larger. *E. gracile* is of stricter habit, with oblanceolate or oblong leaves, the turbinate involucre with rigid acute teeth. Eastward of the Sierra Nevada, in the valleys and on the foothills; collected in North-western Nevada by Dr. Torrey (n. 439), by W. W. Bailey and Watson on King's Survey (n. 1029–1031), in Owen's Valley by Horn (n. 2851, California State Survey), and in Arizona or Southern Utah by Dr. E. Palmer.

URTICA LYALLII. Perennial, tall and rather slender, more or less spinulose and hispid or becoming nearly glabrous; leaves thin, cordate-ovate, 3–6 inches long, on petioles 2–4 inches long, acute, coarsely serrate, the teeth sometimes sparingly serrulate, the young leaves densely hispid beneath; stipules large, broadly oblong, obtuse; flowers in loose spreading or deflexed slender panicles, equalling or rather shorter than the petioles; perianth broadly ovate or nearly orbicular, rounded at the apex, shorter than the broadly ovate achenium, which is $\frac{2}{3}$ of a line long — A very large leaved species collected by Dr. Lyall in the Cascade Mts. in lat. 49°, and in Marin County, California, by Bolander and Kellogg, the latter specimens more densely hispid. A slenderly branched and nearly smooth plant collected by Dr. Lyall at Vancouver's Island is probably the same.

URTICA BREWERI. Perennial, stout, tall and branching, grayish

hispid and quite spinulose; stipules oblong-lanceolate; leaves thin, ovate or the upper oblong-lanceolate, 2-4 inches long, acute, subcordate or rounded at base, coarsely serrate, finely hispid beneath, tuberculately roughened above; petioles $\frac{1}{2}$ -1 $\frac{1}{2}$ inches long; flowers in short loose open panicles, scarcely exceeding the petioles; perianth obovate, obtuse, minutely hispid, nearly a line long, twice longer than the broadly ovate achenium. — Los Angeles, California, frequent in waste places (Brewer, n. 95); collected also by Bigelow on the banks of the Limpio in Western Texas (*U. dioica*, Torrey in Bot. Mex. Boundary, in part), and also by Wolf on Lieut. Wheeler's Survey in Southern Colorado.

The only other Californian species of the genus is *U. holosericea* of Nuttall's *Pl. Gambelliana* (the same probably as *U. trachycarpa* of Weddell), which is found near Monterey. It is densely hoary-tomentose, especially on the lower side of the leaves; the oblong stipules acuminate; leaves thick, oblong-lanceolate and acuminate, on short petioles; male flowers in loose slender panicles nearly equalling the leaves, the female more numerous in dense and shorter panicles; perianth ovate, densely hispid, about equalling the small broadly ovate achenium. Eastward of the Sierra Nevada, in Nevada and Southern Utah, the western finely tomentose or velvety form of *U. gracilis* occurs, referred to *U. dioica* in King's Reports, vol. 5, p. 321.

PLATANUS WRIGHTII. Leaves subtomentose beneath, very acutely and deeply 5-7-lobed, the lower lobes projected backwards and forming a deep sinus; petioles $\frac{1}{2}$ -5 inches long; racemes not exceeding the leaves; fertile heads three, 8-10 lines in diameter; nutlets glabrous, villous at base, truncate above and tubercled with the short base only of the style; receptacle densely hairy and fruit-bearing over nearly the entire surface. — Collected by Wright (n. 1880) in southeastern Arizona near the San Pedro, and described as a large tree. It is very distinct from the Mexican and Californian species, in regard to which there is still some confusion.

JUGLANS CALIFORNICA. More or less floccose-tomentose or sometimes nearly glabrous; leaflets 5-8 pairs, oblong-lanceolate, acute, narrowing upwards from near the base, 2-2 $\frac{1}{2}$ inches long; male aments 4-8 inches long, often in pairs; sepals acute or obtuse, veined, 1 $\frac{1}{2}$ lines long; stamens 30-40, the anthers a line long, with the apex of the connective very short and bifid; fruit globose, slightly compressed, $\frac{3}{4}$ -1 inch in diameter; nut shallowly sulcate, the walls rather thin and with two broad cavities upon each side. (*J. rupestris*, var. *major*, Torrey in Sitgreave's Report, p. 171, t. 16.) — A large shrub

or tree, in the vicinity of San Francisco growing 40–60 feet high and 2–4 feet in diameter, and ranging southward to Santa Barbara, Southern Arizona and Sonora. The more eastern *J. rupestris*, Engelm., is but 6–20 feet high, with more numerous and usually more acuminate leaflets, the aments only two inches long with smaller flowers, 20–30 stamens, shorter anthers and a more prominent connective, the globose nut 6–7 lines in diameter with very thick and nearly solid walls.

MYRICA HARTWEGI. Diœcious; leaves deciduous, oblanceolate, acute, attenuate to a short petiole, 2 inches long, serrate above, pubescent, especially on the margin, as also the branchlets; staminate spikes solitary, cylindrical, 5–8 lines long, many-flowered; bracts glabrous, brown, imbricated, broadly ovate, acute; stamens 3–4, shorter than the bracts, the filaments united at base; female flowers and fruit unknown. (*M. Gale*, Benth. in *Pl. Hartweg.*) — Collected by Hartweg (n. 1958) on the Sacramento, by Fremont, and on the south fork of the Merced near Clark's Station by Mr. Muir, who describes it as a small bush six feet high. It differs from *M. Gale* (which is not known from south of Alaska on the Pacific Coast) in its larger, thinner, acute and more coarsely toothed leaves, the male aments rather longer and less crowded.

POPULUS FREMONTII. Leaves puberulent, especially upon the margin, subreniform, abruptly acute, rather deeply sinuate-dentate, the many incurved teeth scarcely glandular-tipped; petioles slender, equaling the blade, somewhat flattened above; male aments stout, 4–5 inches long, loose, with slender pedicels 8–10 lines long, and naked laciniately fringed bracts, the torus thick and conspicuous, 3–4 lines broad; stamens 60 or more; fruiting aments 4 inches long, with pedicels 2 lines long, the three stigmas broadly dilated and irregularly lobed; fruit ovate, 3–4 lines long, as broad as the torus, with three very thick finely tuberculate valves, the sutures not prominent. — Collected by Fremont (n. 243, 244 of 1846) on Deer Creek at "Lassens" in the Upper Sacramento Valley. The young branches are light gray, slightly pubescent, not angled. Distinguished especially by the remarkably developed torus.